NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Is Grandpa Right, Were Winters Colder When He Was A Boy?

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=97

Is Grandpa Right, Were Winters Colder When He Was A Boy?

Purpose: To use historic weather information and compare with current data to determine if there is significant temperature change

Image courtesy NOAA

Grade Level: 6 – 8

Estimated Time for Completing Activity: 50 minutes

Learning Outcomes:

- Students will access NOAA and NASA climate data from Internet resources.
- Students will determine changes in average temperatures, precipitation and cloud cover over time from data.
- Students will relate global changes to local changes.

Prerequisite

- Familiarity with using latitude and longitude coordinates
- Familiarity with reading line graphs

Tools

- Computer with Internet Access
- Printer (optional)

National Standards:

Geography: Environment and Society
Math: Data Analysis and Probability
Science Content: A Science as Inquiry
Science Content: D Earth and Space Science
Science Content: F Science in Personal and Social Perspectives

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Virginia Standards of Learning:

PS.1: The student will plan and conduct investigations in which b) length, mass, volume, density, temperature, weight, and force are accurately measured and reported using metric units (SI-International System of Units); h) data tables showing the independent and dependent variables, derived quantities, and the number of trials are constructed and interpreted; i)data tables for descriptive statistics showing specific measures of central tendency, the range of the data set, and the number of repeated trials are constructed and interpreted; j) frequency distributions, scattergrams, line plots, and histograms are constructed and interpreted; and k) valid conclusions are made after analyzing data.
PS.7: The student will investigate and understand temperature scales, heat, and heat transfer. Key concepts include Celsius and Kelvin temperature scales and absolute zero.
Sci6.1: The student will plan and conduct investigations in which c) precise and approximate measurements are recorded; h) data are collected, recorded, analyzed, and reported using appropriate metric measurements; and i) data are organized and communicated through graphical representation (graphs, charts, and diagrams).
Sci6.6: The student will investigate and understand the properties of air and the structure and dynamics of the Earth's atmosphere.

Vocabulary:
anomaly
climate
temperature
weather

Lesson Links:
NOAA Paleoclimatology Website
Live Access Server
Historical Climate Data Search Interface

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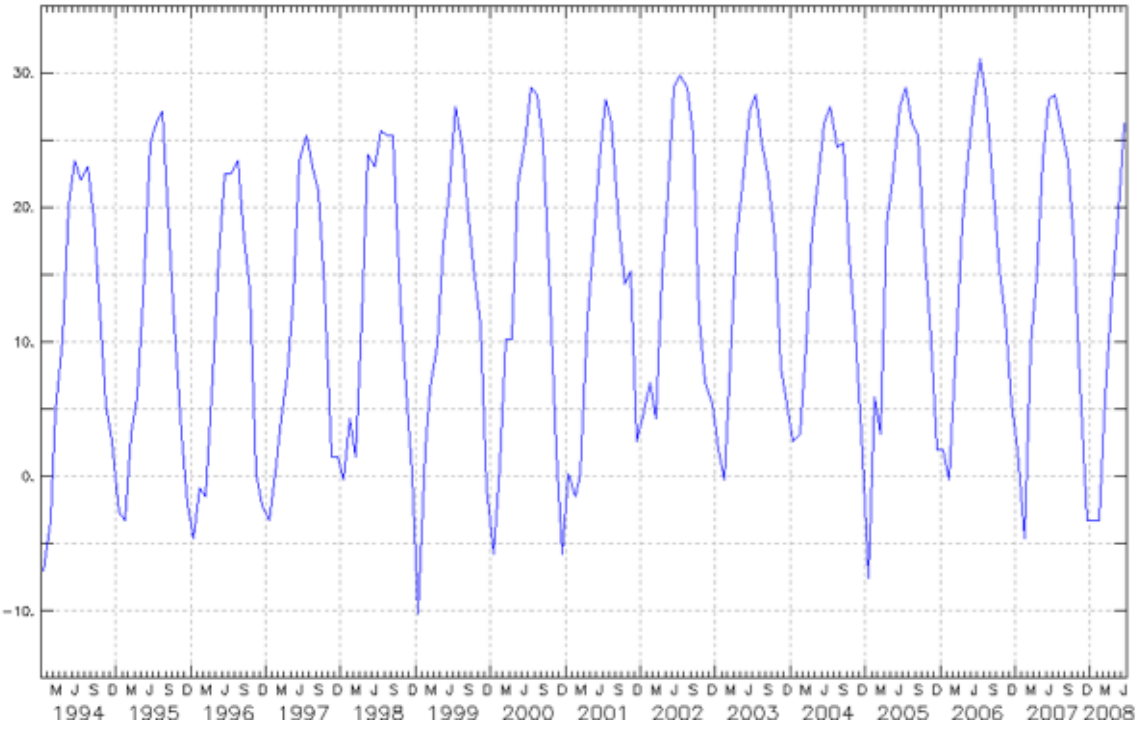
Background:

Students often hear that winters were colder or had more snow in the past. This activity will help them to determine if this is a true or accurate statement for their location.

Procedure:

Use the following 3 plots to answer questions 1 – 4 below. These plots are for Walnut Grove, Minnesota, site of one of the Little House on the Prairie books.

Plot 1 – Near-Surface Air Temperature (degrees Celsius) (44.22 N, 95.47 W)



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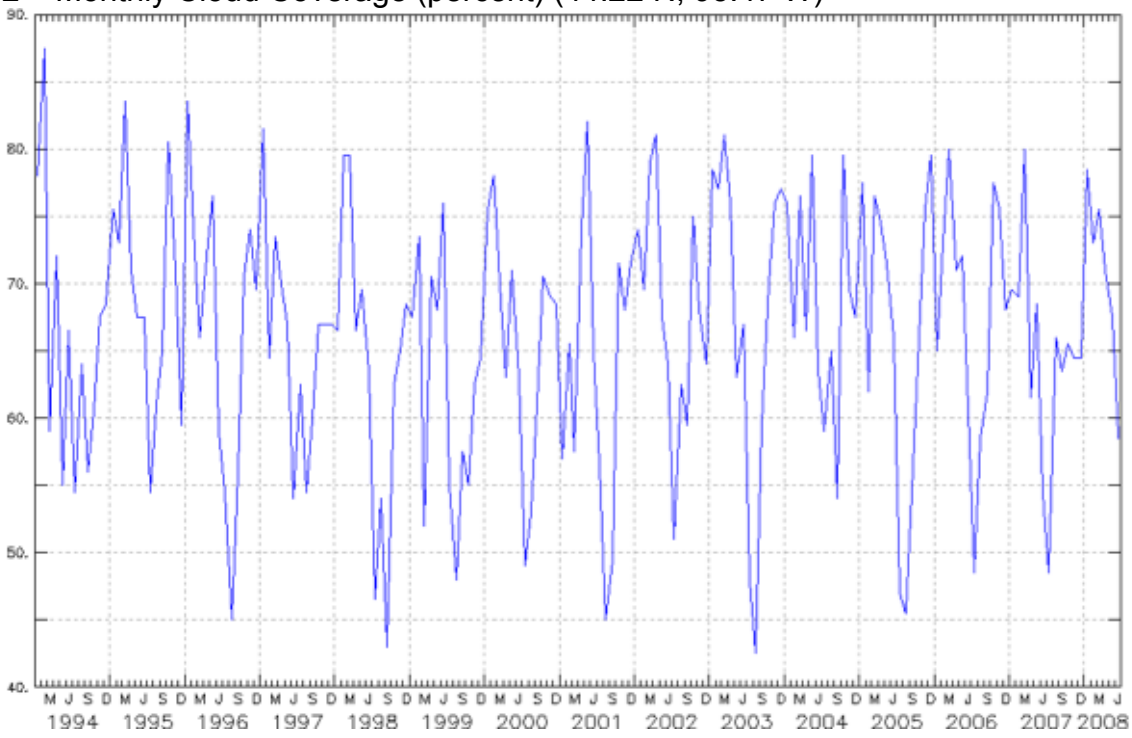
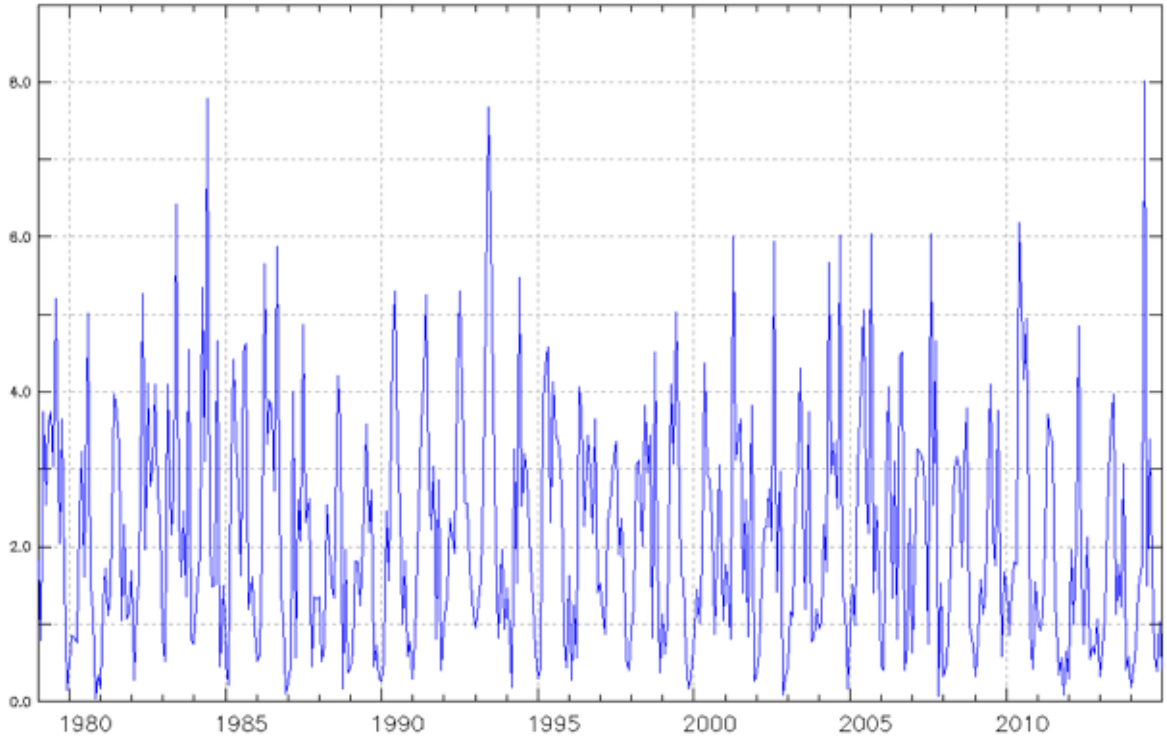
Plot 2 – Monthly Cloud Coverage (percent) (44.22 N, 95.47 W)



Plot 3 – Monthly Precipitation (millimeters per day) (44.22 N, 95.47 W)



NAME:_____ DATE:_____ CLASS:_____

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Questions:

1. What trends can you determine from the graphs of temperature, precipitation and cloud cover? (Pay attention to the x-axis in the plots.)

2. Is it an accurate statement that winters were colder in the past? Discuss.

3. What are some possible reasons for the changes?

4. Were there notable short-term changes that may have been caused by geophysical events such as a large volcanic eruption?

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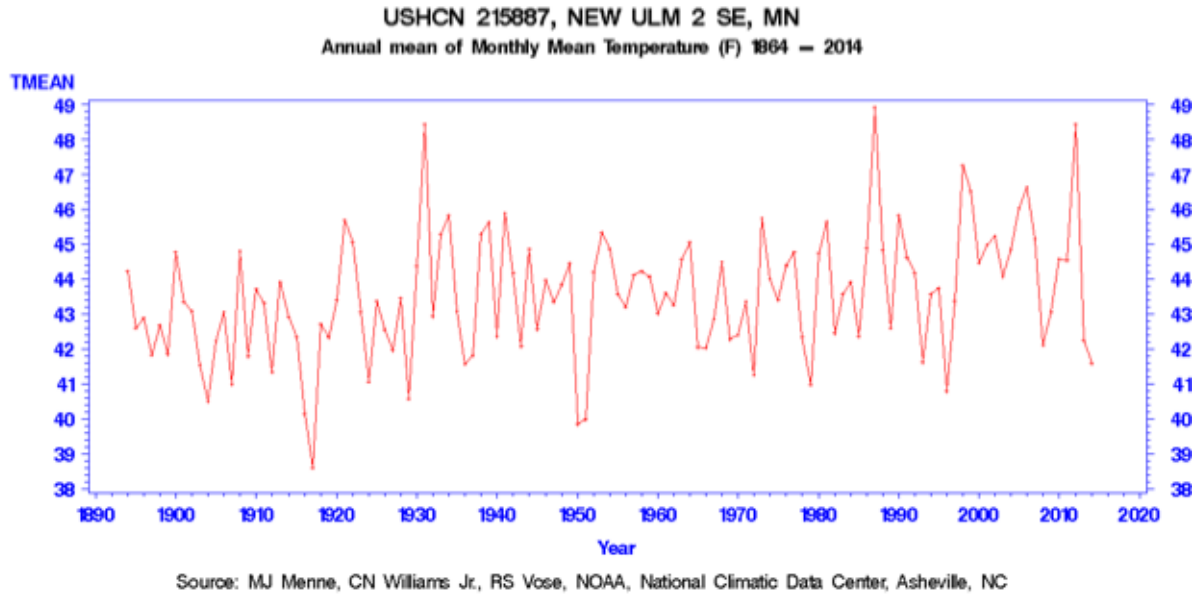
The temperature plot above, which starts in 1994 (based on satellite data) clearly does not go back to the time of Little House on the Prairie. We can get closer using temperature data from thermometers on the ground using this website: http://cdiac.ornl.gov/epubs/ndp/ushcn/ushcn_map_interface.html
While there is not a site at Walnut Grove, the site in New Ulm, MN is fairly close. And data are available back to the 1890s (Little House took place in the 1870s). Using this plot, revisit questions 1-4 on the previous page. Do any of your answers change after looking at the longer record of temperature?

Plot 4 – Annual Mean Temperature (Degrees Fahrenheit) (44.3 N, 94.5 W)



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Extensions:

1. Examine historical climate data for your area to see if there has been a change in summer or winter temperatures over the past century.

2. Read historical fiction or non-fiction accounts of weather-related events (ex. The Long Winter, Ingalls)

Lesson plan contributed by Rita Crocker, Holden, Missouri